



P-ISSN: 2349-8528

E-ISSN: 2321-4902

IJCS 2019; 7(6): 1868-1871

© 2019 IJCS

Received: 04-09-2019

Accepted: 06-10-2019

Chaithu Sarakham Aimol

Department of Optometry,
Regional Institute of
Paramedical and Nursing
Sciences, Zemabawk, Aizawl,
Mizoram, India

L Inaotombi Devi

Department of Medical
Laboratory Technology,
Regional Institute of
Paramedical and Nursing
Sciences, Zemabawk, Aizawl,
Mizoram, India

Enghmingliani

Department of Ophthalmology,
Civil Hospital, Aizawl, Mizoram,
India

Renee Lalrinzuali

Department of Optometry,
Regional Institute of
Paramedical and Nursing
Sciences, Zemabawk, Aizawl,
Mizoram, India

Renee Lalrinzuali

Department of Medical
Laboratory Technology,
Regional Institute of
Paramedical and Nursing
Sciences, Zemabawk, Aizawl,
Mizoram, India

Corresponding Author:

L Inaotombi Devi

Department of Medical
Laboratory Technology,
Regional Institute of
Paramedical and Nursing
Sciences, Zemabawk, Aizawl,
Mizoram, India

International Journal of Chemical Studies

Prevalence of myopia in urban school children in the age group of 13-19 years in Aizawl district of Mizoram India

Chaithu Sarakham Aimol, L Inaotombi Devi, Enghmingliani, Renee Lalrinzuali and Lalsanglura Ralte

Abstract

Myopia is one of the most common ocular disorders seen in children and young adults and is a cause of concern world-over. The prevalence of myopia did not exceed 50% in any of the regions in 2000, but, by 2050, the prevalence will be more than 50% in 57% of the countries, if current trends continue. The prevalence of myopia among the School Students in the age group of 13-19 years in Aizawl district of Mizoram was 51.90%. The prevalence of non-myopia, mild myopia, moderate myopia and high myopia observed were 48.5%, 48%, 3.5% and 0.3% respectively. The female students have higher percentage of myopia compare to the male students.

Keywords: Myopia, school going children, Aizawl, prevalence rate

Introduction

Myopia which is also commonly called as near or short sightedness is a refractive error of the eye. It is an important cause of correctable visual impairment and preventable blindness worldwide (Belete *et al.*, 2017) [1]. Myopia is one of the most common ocular disorders seen in children and young adults and is a cause of concern world-over (Resnifoff *et al.*, 2008; Morgan *et al.*, 2012; Pan *et al.*, 2012; Wu *et al.*, 2016 Saxena *et al.*, 2017). Globally, the prevalence rate among the older teenager is approximately 20%-35% (Belete *et al.*, 2017) [2-6]. While the prevalence of myopia has been reported to be very high in Asia (Matsumura and Hirai, 1999; Yoon *et al.*, 2011) [7, 8], it is not yet considered a cause of concern in India. A previous study by Saxena and his associates had reported a prevalence of only 13.1% among school children in India (Saxena *et al.*, 2015) [9]. However, this is higher than most previous reports from India (Dandona *et al.*, 2002; Murthy *et al.*, 2002; Saxena *et al.*, 2017) [10, 11, 6]. The prevalence rates have increased since the 1950s. It is estimated to affect 1.5 billion people, 22% of the population (Foster and Jiang, 2014, Holden *et al.*, 2014) [12, 13]. By the year 2020, it is estimated that 205 billion people – one third of the world's population will be affected by myopia (Wojciechowski, 2011) [14]. According to published reports, the prevalence of myopia did not exceed 50% in any of the regions in 2000, but, by 2050, the prevalence will be more than 50% in 57% of the countries, if current trends continue (WHO report, 2017; Holden *et al.*, 2016) [15, 16]. Among children, it affects 1% of rural Nepalese, 4% of South Africans, 12% of Americans, and 37% in some large Chinese cities (Foster and Jiang, 2014, Pan *et al.*, 2015) [12, 17]. Rates of prevalence vary significantly in different areas of the world (Foster and Jiang, 2014) [12]. The rate of prevalence among the high school students was 80.7% in Beijing (Wu *et al.*, 2015) [18], 84% in Taiwan, 80.00% in Shanghai Province (Lin *et al.*, 2004; Qian *et al.*, 2009) [19, 20], 73.9% in Singapore (Quek *et al.*, 2004) [21], 33.0% and 29.3%, in two Iranian studies in school children of grade 10 to 12 (Fotouhi *et al.*, 2007; Hashemi *et al.*, 2014) [22, 23]. In the present investigation an attempt was made to evaluate the rate of prevalence of myopia among the school going students in the age group of 13-19 years of urban population of Aizawl district of Mizoram, India.

Materials and Methods

The study was conducted on school going students from 7 schools and hospitals in Aizawl district of Mizoram during 2014-2017, who was examined to determine the prevalence of myopia. The vision of the child was documented by the optometrist. Children with sub-normal

visual acuity i.e. those unable to read the 6/9p line on the Snellen chart and those children having previous myopic glasses were further examined by an optometrist for confirmation of vision and refraction if required. Retinoscopy was done using a streak retinoscope (Heine BETA 200) and a modern automated refractor (Matronix Q30+ Korea). The autorefractor was calibrated at the beginning of each working day and a single reading was taken for each eye. The final prescription was based on the subjective refraction. All those children who had normal unaided presenting vision in the first round but failed to read the 6/9p line on the Snellen chart were the new cases of refractive error and were evaluated for identifying cases with myopic refractive error to determine the incidence of myopia. The data analysis was carried out using the SPSS (SPSS, 2001) [24] statistical package for social science.

Result and Discussion

The study on the prevalence of myopia among the school going students, in the age group of 13 – 19 years of the Aizawl district of Mizoram was evaluated from 7 selected schools, hospitals and private clinics located in Aizawl district of Mizoram during 2014-2017. The prevalence of myopia among the School Students in the age group of 13-19 years in Aizawl district of Mizoram is given in the Table 1 and the graphical representation is given in Figure 1. As seen in the table, the prevalence of myopia was 51.90% (963 out of 1854 patients). The prevalence of non-myopia, mild myopia, moderate myopia and high myopia observed were 48.5%, 48%, 3.5% and 0.3% respectively.

Table 1: Prevalence of Myopia in different Age Groups of School going students in Aizawl district of Mizoram

Status		Non Myopia	Mild Myopia	Moderate Myopia	High Myopia	Total
High School (13-15yrs)	Male	54.35 ^a (156)	44.25 ^b (127)	1.39 ^c (4)	0	287**
	Female	48.94 ^a (162)	48.64 ^a (161)	2.41 ^b (8)	0	331**
	Total	51.45 ^{NS} (318)	46.60 ^{**} (288)	1.94 ^{NS} (12)	0	618
Secondary School (16-19yrs)	Male	42.16 ^a (253)	54.33 ^b (326)	3.33 ^c (20)	0.16 ^d (1)	600**
	Female	51.23 ^a (249)	208(42.79) ^b	25(5.14) ^c	4(0.82) ^d	486**
	Total	46.22 ^{NS} (502)	49.17 ^{**} (534)	4.14 ^{NS} (45)	0.46 ^{NS} (5)	1086
Non-Mizos	Male	36.98 ^a (27)	58.90 ^b (43)	2.73 ^c (2)	1.36 ^c (1)	73**
	Female	57.14 ^a (44)	32.46 ^b (25)	9.09 ^c (7)	1.29 ^d (1)	77**
	Total	47.33 ^{**} (71)	45.33 ^{**} (68)	6.00 [*] (9)	1.33 ^{NS} (9)	150
Total		48.05(891)	48.00(890)	3.55(66)	0.37(7)	1854

^{a,b,c,d}Values bearing different superscripts in a row differ significantly. * Significant for $p \geq 0.05$, ** significant for $p \geq 0.01$, NS = Non significant

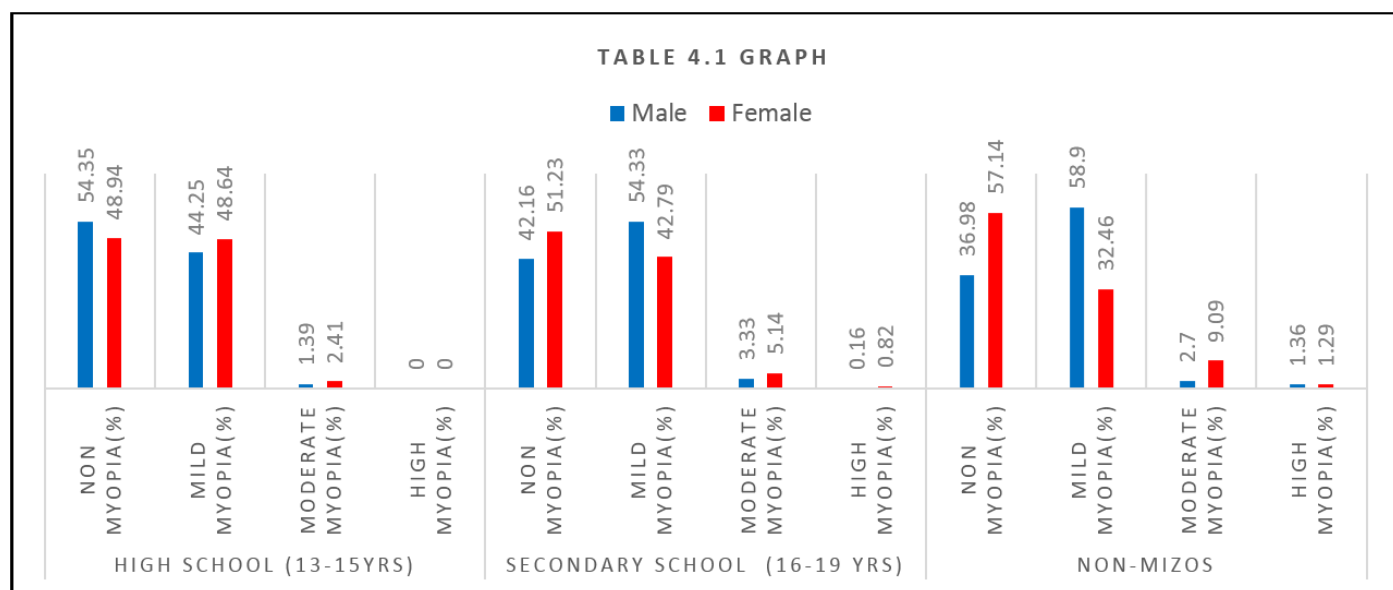


Fig 1: Graphical representation of the prevalence of myopia among the school going students in Aizawl district of Mizoram.

The observed different degree of myopia among the teenager 13 to 15 years of was mild myopia – 46.60% and moderate myopia – 1.94% while the non-myopia students were 51.45%. In the age group of 16-19 years the mild, moderate and high myopia were 49.17%, 4.14%, and 0.46% respectively while non-myopic condition was observed in 46.22%. The non-Mizos have 52.60% of myopia. The present finding of 51.90% prevalence rate among the High School Students in the age group of 13-19 years is between the reported rates on prevalence of myopia in literature. Fotouhi *et al.* (2007) [22] and Hashemi *et al.* (2014) [23] reported the prevalence rate of 33.0% and 29.3% for two Iranian studies in school children of grade 10 to 12. The prevalence rate among the high school

students in Beijing was 80.7% (Wu *et al.*, 2015) [18], 84% in Taiwan, 80.00% in Shanghai Province (Lin *et al.*, 2004; Qian *et al.*, 2009) [19, 20], 73.9% in Singapore (Quek *et al.*, 2004) [21]. This difference in the prevalence rate might be because of the variation in race between the study participants.

In the present investigation the female students have higher percentage of myopia compare to the male students. The observed mild myopia and moderate myopia among the female students in the age group of 13-15 years were respectively 26.05% and 1.39% while among the male students the percentages were 20.55% and 0.64% respectively. The prevalence of Myopia among the age group of 16-19 years was 49.17%, 4.14%, and 0.46% for mild,

moderate and high myopia respectively while non-myopia was 46.22%. The observed mild myopia, moderate myopia and high myopia among the female students were respectively 42.79%, 5.14% and 0.82% while among the male students the percentages were 54.33%, 3.33% and 0.16% respectively. Among the myopic conditions, the rate of mild myopia is significantly higher ($p < 0.01$) compared to other myopic conditions. The least myopic condition was observed for high myopic condition among male students with only 0.16%.

The occurrence of myopia in different ethnic communities i.e. Mizos and non-Mizos were also evaluated. The non-Mizos have 52.60% of myopia compared to 51.90% of Mizos. Among the non-Mizos, the percentage of mild, moderate and high myopia for females were 32.46%, 9.09% and 1.29% respectively while among the males the occurrence was 58.90%, 2.73% and 1.36%. Similar to Mizo students in the age group of 16-19 years, the male students have significantly higher ($p < 0.01$) mild myopia, moderate myopia ($p < 0.05$) however the female students have non-significant higher high myopia among the non-Mizo students.

The higher prevalence rate of myopia among the girl students observed in the present investigation is in agreement with the findings of other workers. Slight but significant gender differences in prevalence of myopia have been found between ages 10 and 15 among a wide range of Caucasian and non-Caucasian ethnic groups (NRC, 1989) [25]. Higher prevalence of myopia among girls has been reported by many workers (Saxena *et al.*, 2015; Czepita *et al.*, 2007; Chen *et al.*, 2018; Wu *et al.*, 2015) [9, 26, 27, 181]. Saxena *et al.* (2015) [9] observed that girls spent greater number of hours in reading and writing at home compared to boys and significantly lesser hours outdoors. This increase in time spent in reading and reduced outdoor activity predisposes them to development of myopia. Therefore girls constitute a high risk group and special efforts should be made to examine girls in this age group and also encourage them to play outdoors. (Saxena *et al.*, 2015) [9]. Gou *et al.* (2016) [28] observed that the prevalence of myopia in girls was higher than in boys (49.7% vs 45.1%), and girls had 1.21 (95% CI=1.01–1.45) times greater risk of myopia than boys and their finding is consistent with a previous study that was conducted in Beijing by Wu *et al.* (2015) [18] showing that the girls were more likely to be myopic than boys (odds ratio=1.31, 95% CI=1.11–1.55) and aligns with a prior Caucasian study (Czepita *et al.*, 2007) [26] reporting that myopia occurs more frequently in girls than in boys. Chen *et al.* (2018) [27] reported higher prevalence of myopia in females compared to males (Chisquared test, $P < 0.005$; except for 2001, $P = 0.087$. From 2001 to 2015, the prevalence of myopia increased 9.7% in female students (81.1% to 90.8%, mean = $88.1 \pm 2.6\%$, $P < 0.001$) and 5.8% in male students (78.3% to 84.1%, mean = $81.1 \pm 2.4\%$, $P < 0.001$). Gender differences probably have little effect on the comparability of data in large samples distributed over a wide range.

References

- Belete AA, Anbesse DH, Tsegaye AT, Hussien MS. Prevalence and associated factors of myopia among high school students in Gondar town, northwest Ethiopia, 2016. *Clin Optom (Auckl)*. 2016; 9:11-18. Published online 2016 Dec 23. doi: 10.2147/OPTO.S120485.
- Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. *Bull World Health Organ*. 2008; 86:63-70.
- Morgan IG, Ohno-Matsui K, Saw SM. Myopia. *Lancet*. 2012; 379:1739-1748.
- Pan CW, Ramamurthy D, Saw SM. Worldwide prevalence and risk factors for myopia. *Ophthalmic & Physiological Optics*. 2012; 32(1):3-16.
- Wu Pei-Chang, Huang Hsiu-Mei, Yu Hun-Ju, Fang Po-Chiung, Chen Chueh-Tan. Epidemiology of Myopia. *Asia Pac J Ophthalmol*. 2016; 5:386-393.
- Saxena R, Vashist P, Tandon R, Pandey RM, Bhardawaj A, Gupta V *et al.* Incidence and progression of myopia and associated factors in urban school children in Delhi: The North India Myopia Study (NIM Study). *PLoS ONE*, 2017; 12(12):e0189774. <https://doi.org/10.1371/journal.pone.0189774>.
- Matsumura H, Hirai H. Prevalence of myopia and refractive changes in students from 3 to 17 years of age. *Surv Ophthalmol*. 1999; 44:S109-S115.
- Yoon KC, Mun GH, Kim SD, Kim SH, Kim CY, Park KH *et al.* Prevalence of eye diseases in South Korea: data from the Korea National Health and Nutrition Examination Survey 2008–2009. *Korean J Ophthalmol*. 2011; 25:421-433.
- Saxena R, Vashist P, Tandon R, Pandey RM, Bhardawaj A, Menon V *et al.* Prevalence of Myopia and Its Risk Factors in Urban School Children in Delhi: The North India Myopia Study (NIM Study) *PLoS ONE*, 2015; 10(2):e0117349. <https://doi.org/10.1371/journal.pone.0117349>
- Dandona R, Dandona L, Srinivas M, Sahare P, Narsaiah S, Muñoz SR *et al.* Refractive error in children in a rural population in India. *Invest Ophthalmol Vis Sci*. 2002; 43:615-622.
- Murthy GVS, Gupta SK, Ellwein LB, Muñoz SR, Pokharel GP *et al.* Refractive error in children in an urban population in New Delhi. *Invest Ophthalmol Vis Sci*. 2002; 43:623-631. pmid:11867576
- Foster PJ, Jiang Y. Epidemiology of myopia. *Eye*, 2014; 28(2):202-208.
- Holden B, Sankaridurg P, Smith E, Aller T, Jong M, He M. Myopia, an underrated global challenge to vision: where the current data take us on myopia control. *Eye*. 2014; 28(2):142-46.
- Wojciechowski R. Nature and nurture: the complex genetics of myopia and refractive error. *Clin Genet.*, 2011; 79:301-320. doi: 10.1111/j.1399-0004.2010.01592.x. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
- WHO report: The impact of Myopia and High Myopia. Accessed October 10, 2017 <http://www.vision2020uk.org.uk/reportimpact-myopia-high-myopia/>.
- Holden B, Sankaridurg P, Smith E, Aller T, Jong M, He M. Myopia, an underrated global challenge to vision: where the current data take us on myopia control. *Eye*. 2014; 28(2):142-46
- Pan CW, Dirani M, Cheng CY, Wong TY, Saw SM. The age-specific prevalence of myopia in Asia: a meta-analysis. *Optometry and Vision Science*. 2015; 92(3):258-266.
- Wu LJ, You QS, Duan JL, Luo YX, Liu LJ, Li X *et al.* Prevalence and associated factors of myopia in high-school students in Beijing. *PLoS One*. 2015; 10(3):e0120764.

19. Lin LLK, Shih YF, Hsiao CK, Chen CJ. Prevalence of myopia in Taiwanese, schoolchildren: 1983 to 2000. *Ann Acad Med Singapore*. 2004; 33:27-33.
20. Qian YS, Chu RY, He JC, Sun XH, Zhou XT, Zhao NQ *et al*. Incidence of myopia in high school students with and without red-green color vision deficiency. *Invest Ophthalmol Vis Sci*. 2009; 50:1598-1605.
21. Quek TP, Chua CG, Chong CS, Chong JH, Hey HW *et al*. Prevalence of refractive errors in teenage high school students in Singapore. *Ophthalmic Physiol Opt*. 2004; 24(1):47-55.
22. Fotouhi A, Hashemi H, Khabazkhoob M, Mohammad K. The prevalence of refractive errors among schoolchildren in Dezfoul, Iran. *Br J Ophthalmol*. 2007; 91:287-292.
23. Hashemi H, Rezvan F, Beiranvand A, Pap OA, Hoseini Yazdi H, Ostadimoghaddam H *et al*. Prevalence of refractive errors among high school students in Western Iran. *J Ophthalmic Vis Res*. 2014; 9:232-239.
24. SPSS. Statistical Package for Social Sciences. SPSS Inc., 444 Michigan Avenue, Chicago, 2001, IL60611.
25. National Research Council (NRC,US) Committee on Vision. Myopia: Prevalence and Progression. Washington (DC): National Academies Press (US); 1989. 2, Analysis of the Prevalence Literature.
26. Czepita D, Mojsa A, Ustianowska M, Czepita M, Lachowicz E. Role of gender in the occurrence of refractive errors. *Ann Acad Med Stetin*. 2007; 53(2):5-7.
27. Chen M, Wu A, Zhang L, Wang W, Chen X, Yu X, Wang K. The increasing prevalence of myopia and high myopia among high school students in Fenghua city, eastern China: a 15-year populationbased survey. *BMC Ophthalmol*, 2018; 18:159.
28. Gou L, Yang J, Mai J, Du X, Gou Y, Li P *et al*. Prevalence and associated factors of myopia among primary and middle school-aged students: a school-based study in Guangzhou. *Eye (Lond)*. 2016; 30(6):796-804.